Significant development pressure currently affects the flows of the Verde River. In order to protect habitat values, there is need to identify the volumes of water required on a seasonal basis that would be needed to protect the habitat values of the river.

**PROJECT TEAM**

**Investigators**
Abe Springer (NAU) - Lead
Juliet Stromberg (ASU)
Susanna Eden (UA)

**External Partners**
The Nature Conservancy: Dan Campbell, Jeanmarie Haney, Rob Marshall, Dale Turner
Verde River Basin Partnership
Phil Pearthree (Arizona Geological Survey)
Larry Stevens (Museum of Northern Arizona)

**PROJECT FUNDING CYCLE**

2007

**PROJECT GOALS**
The primary goal of *Verde River Ecological Flow Science – A Collaborative Approach* was to assess the seasonal surface water flows required to support the Verde River ecosystem. The Ecosystem Flows approach used in this project provides the framework for bringing a multi-disciplinary science team together to assemble the information needed to define relationships between water supply conditions and the biological system, including both plants and animals. This project also supports the data requirements of a congressional mandate for the Verde River Partnership.

**BACKGROUND/RESEARCH METHODS**
Because it is one of the few free-flowing rivers remaining in Arizona and because it is biologically very rich, the Verde River is a critical component of life in central Arizona and beyond for both the natural and human communities. There is concern about how the growing human water needs of the area are going to be met while also preserving the important ecological values of the Verde River. Proactive long-term water management, armed with credible information on the water needs of the ecosystem, can address and minimize consequences to the ecosystem from various growth and management scenarios before impacts happen. The Verde River Ecological Flows study was a collaboration of The Nature Conservancy and the Arizona Water Institute. The study’s purpose was to develop conceptual models of the Verde River ecosystem that link hydrologic variation to ecological response in the hope that these models would guide future data collection and ultimately lead to better-informed water management. To understand consequences to the ecosystem of various water use scenarios, it is necessary to understand the hydrology-biology relationships that form the basis for the water needs of the ecosystem. Ecosystem water needs encompass more than consumptive use by riparian vegetation, and include both streamflow regime (magnitude, frequency, duration, and timing of flows) and groundwater conditions (depth to groundwater and annual groundwater level fluctuations). At locations around the globe, water managers and planners are address-
Identifying fish habitat availability as it relates to stream flow. Results from such integrated data collection should provide the essential platform for quantifying the responses of plants and animals to changes in river flow.

**KEY STAKEHOLDER ENGAGEMENT and OUTCOMES**

This study supported the development of an interdisciplinary team of ecologists, hydrologists, biologists, and geologists who are committed to working with water managers in the Verde River watershed to identify management strategies that will help preserve the river’s important habitat while facilitating development that protects key watershed values. The outcomes of this project have already led to a focused data collection effort in Phase II. This will ultimately lead to water and land management recommendations for the area.

**CONCLUSIONS and RECOMMENDATIONS**

AWI is funding Phase II of the Ecological Flows investigation during the 2008 funding cycle. When funding becomes available from Congress for the US Geological Survey (USGS) work with the Verde River Basin Partnership, the findings will be integrated with other studies and Title II reporting requirements. The AWI-funded research will provide characterization of the river that is needed when considering watershed protection and development trade-offs.

**FIND OUT MORE**

**Project Final Reports and other information available at**

www.azwaterinstitute.org

**ARIZONA WATER INSTITUTE**

845 N. PARK AVENUE SUITE 532

TUCSON, AZ 85719

520-626-5627

---

**KEY SCIENCE FINDINGS**

Priority research goals include better characterization of the river and its floodplain with representative cross-sections and longitudinal profiles, developing information on the flood stage that can be expected with various flow levels, and documenting depth to groundwater at representative study sites. Biological research priorities include measuring vegetation attributes at the same representative sites, and quantifying fish habitat availability as it relates to stream flow. Results from such integrated data collection should provide the essential platform for quantifying the responses of plants and animals to changes in river flow.